

Ethical Questions of Equitable Worldwide Food Production Systems

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Agnes is a 32-year-old Ghanaian woman living in a small village 100 miles from the nation's capital, Accra. She cultivates and harvests maize (*Zea mays*), cassava (*Manihot esculenta* Crantz.), and cowpea (*Vigna unguiculata*) in the family's small farm and then processes these for her family's meals. Two years ago, scientists from an international organization approached her village with a novel idea: They showed Agnes how to improve cultivation of cocoa plants alongside her staple crops. Agnes, along with other women in her community, formed a group that now sells their raw cocoa to a distributor in Accra for a fair price. With their additional income, the women have been able to purchase fertilizer and higher-yielding maize seeds for their farms, which has resulted in a greater and more stable food supply; in addition, they are investing in a telephone to better coordinate their relationship with their distributor in Accra.

Rodrigo, a 13-year-old boy, is employed as a worker on a large orange plantation in Ecuador. A U.S. orange juice distribution company buys oranges from this company, mixes the juice with other fruit juice from South Africa and Florida, and sells the product to distributors and vendors in Europe and the United States. Rodrigo earns barely \$1 (U.S. currency) per day, works long hours, has no time to go to school, and is often exposed to unhealthy chemicals used by the growers to control pests on the orange trees. Despite his conditions, he knows that the income from this job is vital to his family's survival.

These stories provide two vastly different examples of worldwide food production systems. Food production systems are sets of related activities that generate food products for human consumption, and are defined by the elements of land, labor, capital, technology, and the market and non-market institutions governing their allocation. Traditionally, food production systems could largely be understood as farming systems, where "several activities are closely related to each other by the common use of the farm's labor, land, and capital, by risk distribution, and by the joint use of the farmer's management capacity" (Ruthenberg, 1971). Food production systems go beyond farming systems, however, in the sense that the

production of food is not bound exclusively to a farm or group of farms, and includes different stages of production and/or processing that transcend farm boundaries; i.e., the conversion of oranges into orange juice takes place in different regions or countries, from farms to industrial processing plants. In addition, it is important to note that food production systems vary by agroclimatic conditions, natural resource endowments, and especially by institutional relationships in particular regions (Binswanger et al., 1989). In recent years, food production systems have become progressively globalized, and hence the linkages from "farm to table" are increasingly more complex. (Globalization refers to the process of increased trade, investment, and capital flows across national borders, as well as the concomitant rise of information technology, which contributes to the rapid transfer of knowledge, products, and services.) Agnes is engaged in smallholder agriculture, producing just enough food for her family, but because of improved access to the transfer of technology and knowledge, she is able to take advantage of globalization to the great benefit of her family's food security. Rodrigo's story illustrates the growing presence of industrialized agriculture in developing countries, along with a much more complicated side of globalization.

An important link between these two stories is the issue of economic equity—or the reduction of poverty through increased access to income-generating opportunities. An equitable food production system is one that benefits impoverished people and groups that are disadvantaged or discriminated against, and it is vital in facilitating the reduction of poverty, through increasing food security as well as through providing broader economic development opportunities.

Questions of equity are important in the world's food production systems today, because roughly 80% of the world's 1.2 billion poor are dependent on agriculture for their survival. Poverty, along with a growing world population, which is expected to reach 8.5 billion in 2020 and is increasingly concentrated in urban areas, are exerting pressure on the world's food systems to accelerate production to meet the increasing demand for quantity and diversity of food. Equity in food production systems is thus vital in assuring that this acceleration holds benefits for and does not exclude the world's poor. Creating an equitable food production system involves improving poor people's access to land and

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other natural resources crucial to farming, such as water; developing access to advanced technology, such as improved seed varieties as well as information technology; developing access to physical infrastructure and to local and international markets; developing greater labor productivity; and investing in improving women's education and status (Pinstrup-Anderson et al., 2001).

However, an equally important link between the above stories concerns the ethical implications of creating equity in food production systems. Both Agnes and Rodrigo are deriving income from food production systems; however, in Rodrigo's case, unlike Agnes', his situation poses pressing ethical concerns. His health is at risk because of environmentally unsound work conditions, and his rights as a child are violated. Thus, a focus on equity in food production systems without an accompanying emphasis on questions of ethics falls short from a moral and humanitarian perspective.

Although it is recognized that there are tremendous variations in global food production systems, cultural values, and economic circumstances, this paper aims to emphasize the general importance of ethics in food production, and to pose the following questions: What principles define ethical issues in world food production systems? What are ethical issues arising from conflicts between economic efficiency and equitable production systems? Does the form of production pose ethical questions? Under what conditions is the sustainability of food production systems an ethical issue?

A FRAMEWORK FOR ETHICS IN FOOD PRODUCTION SYSTEMS

The study of ethics involves evaluating the morality of actions as well as their moral outcomes. From a moral philosophy perspective, the definition of ethics can take different dimensions; for instance, utilitarianism defines "what is ethical" with welfare outcomes for the largest group of people (see, for example, Burns and Hart, 1996). According to utilitarian thought, unethical "means" are justified if the consequence results in a greater good for society. On the other hand, from a deontological perspective, where actions are "right" in themselves, "what is ethical" is defined by individual actions, not outcomes (see, for example, Palmer, 1983).

For the purposes of this paper, we will not engage in a debate on the philosophical perspectives of ethics but will use as a framework common ethical standards based on fundamental human rights, as outlined in numerous international declarations: principally, the United Nations Declaration of Human Rights, the International Labor Organization Conventions, the Declaration of the United Nations Conference on the Human Environment, and the Convention on Biological Diversity. It is recognized that customary, religious, and local rights may set

different standards than some of the above stated rights and principles; however, these documents represent the most extensive convergence of international ethical principles to date.

The Right to Adequate Food

People have a right to freedom from hunger, and everyone has a right to have access to adequate food (United Nations, Declaration of Human Rights, 1948).

The Rights of Labor

Everyone, without any discrimination, has the right to equal pay for equal work; everyone who works has the right to just and favorable remuneration ensuring for himself and his family an existence worthy of human dignity and supplemented, if necessary, by other means of social protection (United Nations, Declaration of Human Rights, 1948). Everyone has freedom of association, the right to organize, the right to collective bargaining, to be free from forced labor, and to equality of opportunity and treatment (International Labor Organization, Constitution, 1920); and child labor (children less than 15 years old) shall be abolished (International Labor Organization, Constitution, 1920).

The Right to Own Property

Everyone has the right to own property alone as well as in association with others, and no one shall be arbitrarily deprived of his or her property (United Nations, Declaration of Human Rights, 1948).

The Right to Education

Everyone has the right to education. Education shall be free, at least in the elementary and fundamental stages. Elementary education shall be compulsory (United Nations, Declaration of Human Rights, 1948).

The Right (and the Right of Future Generations) to a Healthy Natural Environment

Man has the fundamental right to freedom, equality, and adequate conditions of life in an environment of a quality that permits a life of dignity and well-being (Declaration of the United Nations Conference on the Human Environment, 1972); and where nature itself must be valued "... And where there is a recognition of the limits to humans' restructuring of the natural world" (United Nations Convention on Biological Diversity, 1994); the right to act to protect the environment; and the right to engage in environmental decision making (United Nations, Declaration of Human Rights, 1948).

Using these rights-based criteria as a starting point, we can provide a brief overview of ethical questions

of equitable world food production systems, specifically surrounding the use of land, natural resources, labor, and technology.

ISSUES OF ETHICS AND EQUITY IN FOOD PRODUCTION SYSTEMS

Natural Resources, Land Acquisition, and Farm Size Distribution

Land distribution (e.g. farm size), access to land, and natural resource use are essential components of an equitable food production system, because access to these factors for food production are key to poverty reduction. However, resource depletion, loss of biodiversity, pollution, and climate change are realities that have contributed to rising concerns about the effects of agriculture on ecosystems, especially in developing countries, where population growth has risen dramatically without a concomitant strengthening of institutional systems designed to manage and conserve natural resources (Hayami, 2001). In poor countries, farmers are oftentimes forced to extend their farm boundaries, frequently moving to more ecologically fragile areas, such as mountainsides, rainforests, and wetlands. It is estimated that approximately 400 million hectares of agricultural land are degraded worldwide, composing 19% of the world's total farm area. Six percent or 130 million hectares are considered irrevocably degraded and cannot be used for future farming (de Haen, 1997).

From a sustainable perspective, the human right to food and to a healthy natural environment are inextricably related, because environmental degradation jeopardizes the world's capacity to meet rising food needs. In addition, as the opportunities for agricultural production decline because of the depletion of natural resources, communities in the developing world that depend on agriculture as their primary source of income face the loss of broader economic development opportunities. In a long-term view, equitable food production and ethical principles—the rights of humankind to a healthy environment, the rights of future generations to inherit natural resources, and the human right to food—are therefore overlapping and complementary.

In the short-term, however, there can be trade-offs between environmental sustainability and food security needs, and complicated ethical questions ensue. What if, for example, the banning of deforestation in western China or an area of the Brazilian Amazon meant that local communities could not clear the land for food production and could not sell the timber from the forest for desperately needed income? Indeed, “conservation systems are bound to be strongly resisted by the current users who fear that their income will decline, especially [for] the poor who already live at a near-subsistence level” (Hayami, 2001). This apparent contradiction of rights is a controversial debate in economic development strate-

gies. Does one ethical principle “trump” another, especially if intensive agriculture results in irrevocable degradation of the natural environment? How can it be ethical, however, to force poor communities into food insecurity and greater poverty?

Access to land and natural resources and the creation of property rights is closely tied to this issue (Otsuka and Place, 2001). The ability to own and retain agricultural farmland is an essential component of preventing natural resource damage, along with enabling consistent food production and hence ameliorating poor smallholder's livelihoods. When populations increase, there is a related demand for farmland. Without clear and legally enforced property rights to agricultural land, food production suffers, and farmers are unable to invest in their land in a sustainable way.

Ethical issues emerge when debating the methods of achieving equitable land acquisition systems, especially concerning the costs and benefits between traditional, communal land inheritance systems and market-led land distribution. Views on how property rights are best distributed vary tremendously between different cultures. On the whole, in communal tenure systems, land is distributed more equitably between community members. However, communal property rights systems, which frequently incorporate land inheritance from family to family as a principle, can contribute to environmental degradation; for instance, farms may be gradually reduced in size as the land is parceled out to family members. If there are economies of scale—meaning, if larger farms are more productive than smaller ones for certain crops—this will then reduce the overall efficiency of land use and labor, contributing to the loss of income and thus creating inequity.

However, when property rights are individualized—meaning, they are subject to market transactions—what are the implications for equity and human rights? There is a danger that the poorest members of a community will not be able to afford to purchase land, and their food security may be dramatically reduced. Further, market-based land distribution can increase inequity for female farmers, if women are accorded little voice and community rights. However, migrant laborers, who often face discrimination in finding and keeping land in communal tenure systems, may have easier access in obtaining property rights through renting in market-based systems (Otsuka and Place, 2001). In addition, because market development plays a crucial role in poverty reduction, a system of market-based land rights may improve equity through encouraging trade and market development in the agricultural sector. There are thus trade-offs in terms of both equity and ethics for these two approaches to land acquisition.

Another issue that poses ethical concerns is farm size distribution, which is highly unequal around the world. About 300 million smallholders, mostly with

less than 1 ha, cultivate land partly for home consumption of the crops. Many of these smallholders survive on other off-farm income sources. Particularly stark differences exist in Eastern Europe and in the former Soviet Union, where about 40 million subsistence farm units, many only a fraction of 1 ha, co-exist with huge farms of several hundred or thousands of hectares each. Similarly, large inequalities are found in Latin America and in parts of Southern Africa, where in many countries, the inequality of land ownership is much larger than the already high inequality of income. Unequal land distribution contributes to inequity by severely reducing economic productivity of labor and inhibiting access to markets for poor communities. In addition, violent processes of land expropriation have taken place, violating fundamental human rights of the landowners. Land reforms are thus an important issue in many developing countries and a complex political and economic task, but achieving equitable land reform to the benefit of the poor communities is associated with controversial ethical questions that must be addressed.

Labor

Agricultural labor is the main source of employment for the vast majority of the world's poor: "The poorest depend mainly on their labor, there is typically little else that they can derive income from" (Lipton and Ravallion, 1993). However, important ethical questions accompany the creation of equity through labor-intensive approaches in food production systems. A focus on labor-intensive approaches to food production may displace investment in labor-saving capital and technology, which could improve the livelihoods and circumstances of women, for instance, and permit them to gain access to off-farm employment. In addition, a strict focus on equity

through labor-intensive approaches could be directly contradictory to other ethical principles of human rights, especially if working conditions are sordid and inhumane, dependent on child labor, or limit a worker's ability to organize and bargain.

Agricultural labor, from field workers in South Asia to cocoa harvesters in Cote d'Ivoire, is surrounded by ethical issues concerning conditions of living, worker treatment, and gender discrimination. In Africa, for instance, women are overwhelmingly responsible for tilling and cultivating crops, and they manage these sunrise-to-sunset activities along with their other roles, such as child rearing and food preparation. This "discrimination against women or indigenous people [also] prohibits work in high-productivity tasks or places through lack of education and skills needed to upgrade tasks; through women's domestic 'duties' that restrict tasks; and through remoteness and language [barriers] for rural minorities" (International Fund for Agricultural Development, 2002).

In industrialized agriculture and increasingly in smallholder export-oriented agriculture, improving the situation of agricultural labor entails building fundamental ethical principles into food production systems based on human rights, as outlined in International Labor Organization conventions. However, what are the equity and ethical impacts of the enforcement of these standards? As in Rodrigo's story, what would be the food security impact for his family if his company began enforcing child labor standards? What if in response to these concerns, the company would switch to more mechanized production? The ethical issues that surrounding the creation of equity in food production systems for agricultural labor often involve complicated issues in relation to fundamental human rights (Fig. 1).



Figure 1. Smallholder farm family in Malawi. Achieving equity in food production for the more than one billion poor farmers of the world may involve difficult ethical trade-offs. For instance, subsistence production helps to achieve household food security, but is often sustained with child labor and at the expense of the children's education; the introduction of new technologies helps to increase production but might harm the environment if not properly adapted; emphasis on labor-intensive farming practices creates employment but may be a burden for women.

Technology

Closely linked to equity in agricultural labor relations is the ancient question of technology and its ethical impacts. "It is a popular scenario that poor but egalitarian rural communities . . . are destroyed by modernization forces . . . resulting in polarization between a small number of wealthy capitalist farmers and a large number of impoverished landless laborers" (Hayami, 2001). There has been a longstanding debate of the social welfare implications of the displacement of agricultural labor because of new technology. In a debate in the United States, the development of the tomato (*Lycopersicon esculentum*) harvester in California was criticized because it displaced poor migrant rural laborers: "We have forgotten that for many people the transition [from rural to urban] was involuntary; that many people have been forced off the farm only into an economic and social limbo in rural towns and urban ghettos" (Schmitz and Seckler, 1970). Certainly, in the long run, avoiding labor-saving technologies reduces efficiency and the potential for economic growth, and "sticking with the hoe instead of the ox-plow" does not help the poor. However, there are equity versus efficiency trade-offs in the short run that pose ethical dilemmas, such as the displacement of labor.

Nevertheless, as the world population along with its need for food grows, new technology is necessary for creating and encouraging new methods of agricultural production and trade for developing equitable food distribution capacity and a food-secure world. The current amount of land under cultivation cannot expand much further without detrimental environmental effects. Therefore, technology in food production must create methods of improving the productivity of the land currently under cultivation. A major way of achieving this is through biotechnology; specifically, through the development of transgenic or genetically modified (GM) organisms. Government agencies and private companies around the world are engaged in scientific research to genetically modify crops using the methods of biotechnology with the aim of improving food security in the developing world. "Modernized agriculture is capable of making a large contribution [to economic growth]," stated Nobel Prize winner, economist Theodore W. Schultz. "Incentives to guide and reward farmers are a critical component. Once there are investment opportunities and efficient incentives, farmers will turn sand into gold" (Schultz, 1964). With advances in biotechnology, this may well be possible.

Without question, biotechnological advancements generate controversial questions of ethics and equity in contemporary food production. Biotechnology holds the potential to greatly increase equity for poor communities; for instance, in areas of the world where poor communities are subject to extreme weather patterns, crop-destroying pests, and experience vast problems of malnutrition, biotechnology

could greatly improve food security as well as offer wider possibilities for economic development. Further, environmental degradation may decrease with biotechnology, as some transgenic potato (*Solanum tuberosum*), cotton (*Gossypium hirsutum*), and maize varieties require far less chemical pesticides and as GM crops reduce soil erosion by eliminating the need for mechanical tilling. Such advancements in the field of GM food imply potential equitable and ethical benefits, by increasing food yield, by reducing input costs (i.e. less pesticide), and by potentially contributing to environmental sustainability and the continued productivity of farmland. There is thus a strong argument, from impoverished communities especially, to facilitate and bring about advancements in GM crops to not only increase trade but to improve health and nutrition.

However, there are numerous concerns surrounding biotechnology, primarily concerning the long-term impact on the natural environment (biosafety), food safety, and cultural values and traditions. Continued study and communication is needed while this new technology is being developed to offer clear insights into evaluating its long-term impact on the environment and human health. The ethical issue relates to weighing the risks of action versus inaction; a complex issue, where the interests of the poor have to be considered, because the expected net benefits of technology differ between rich and poor, but also because the latter usually lack a voice in these debates. In a world where 800 million people are chronically malnourished and where environmental degradation poses a real and fundamental threat to the sustainability of our earth as well as our food supply, what is the true ethical course of action? Is it ethical to wait for conclusive evidence if it means stalling the potential benefits for so many in need?

CONCLUSIONS

Is Agnes' story possible? Can food production systems provide direct benefits to the world's 1.2 billion poor through the creation of access to local and global markets and income-generating opportunities, using factors of production such as land, natural resources, labor, and advanced technology, and at the same time, adhere to ethical principles? As illustrated in the beginning of this paper, a focus on exclusively creating equity without consideration of human rights is frequently unacceptable from a humanitarian perspective.

In this essay, we have used the international human rights framework as a point of entry for addressing some of the ethical questions of world food production systems, while recognizing that an attempt to incorporate ethics in food production must draw from regional and local rights, customs, and value systems. In conclusion, it must be re-emphasized that it is essential to engage grassroots participation in

any debate on ethics in equitable food production systems—with the end goal of enabling local communities to decide upon and build ethical criteria in equitable food production systems.

At the beginning of these reflections we asked a set of questions, on which we touched in between. Although we make an attempt for indicative answers here at the end, we stress that posing “the ethical question” in the appropriate and well-defined context may be much more important than any attempt of giving generalized answers:

What Principles Define Ethical Issues in World Food Production Systems?

The codified human rights system provides a point of entry for addressing some of the ethical questions of worldwide food production systems. Although human rights provide basic guidelines, regional and local rights and customs (e.g. property rights) play important roles for the ethical dimensions of food production systems, too.

What Ethical Issues Arise from Conflicts between Economic Efficiency and Equitable Food Production Systems?

Inefficient food production systems—for instance, systems that do not make use of new technologies—imply costs, which are at least indirectly paid by someone today or in the future in terms of lost opportunities. Important trade-offs exist between the two, especially at the interface between the use of technology and employment in the short run.

Does the Form of Production Pose Ethical Questions?

Clearly, there are many instances where the form of production poses ethical issues, such as the use of exploitative child labor. Much of child labor is employed in subsistence family farms. It needs addressing through productivity increases on the farm, strong incentives for education, and enforcement of child rights.

In addition, it is important to note here that ethical principles related to the form of production can conflict with each other, leading to questions of “trade-offs” in human rights. Does the human right to food take precedence over other rights, such as the right to childhood education, or to a biodiverse environment? Furthermore, questions exist in debating the ethics of labor intensification in agriculture, as well as in the investment in improved agricultural biotechnology.

Under What Conditions Is the Sustainability of Food Production Systems an Ethical Issue?

Production systems that lead to sustainable development are highly desirable for reasons of both human rights and long-term economic equity; as demonstrated, sustainable land and natural resource

management can ensure food security as well as mankind’s right to a biodiverse environment and can contribute to broader opportunities for economic development. From another perspective, it depends what people do with a resource they extract from nature; for example, if invested in education, this can perhaps lead to sustainable development despite non-sustainable food production.

The call for equity in world food production systems should not be limited to resource distribution. More important in the long run is equity in access to relevant knowledge by the poor. Open access to knowledge, such as research findings relevant for overcoming hunger and the poverty of small farmers, is called for on ethical grounds. This will facilitate acceleration of experiences like Agnes and help to overcome the situation of Rodrigo, whose human rights and opportunities are violated.

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LITERATURE CITED

- Binswanger H, McIntire J, Udry C (1989) Production relations in semi-arid African agriculture. *In* P Bardhan, ed, *The Economic Theory of Agrarian Institutions*. Oxford University Press, New York
- Burns J, Hart H, eds (1996) *An Introduction to the Principles of Morals & Legislation*. Clarendon Press, Oxford
- Convention on Biological Diversity (1994) <http://www.biodiv.org/convention/articles.asp>
- de Haen H (1997) *In* S Vosti, T Reardon, eds, *Environmental Consequences of Agricultural Growth in Developing Countries, in Sustainability, Growth, and Poverty Alleviation*. International Food Policy Research Institute, Washington, DC
- Hayami Y (2001) *Development Economics: From the Poverty to the Wealth of Nations*. Oxford University Press, New York
- International Fund for Agricultural Development (2001) *Rural Poverty 2001: The Challenge of Ending Rural Poverty*. Oxford University Press, New York
- International Labor Organization (1920) *International Labor Organization Constitution*. <http://www.ilo.org/public/english/about/iloconst.htm#pre>
- International Labor Organization (1973) C138. *In* Minimum Age Convention. <http://www.ilo.org/ilolex/english/convdisp2.htm>
- Lipton M, Ravallion M (1993) *Poverty and Policy*. Working Paper: Policy Research Department. The World Bank, Washington, DC
- Otsuka K, Place F (2001) Issues and theoretical framework. *In* K Otsuka, F Place, eds, *Land Tenure and Natural Resource Management*. International Food Policy Research Institute, Washington, DC
- Palmer H (1983) *Kant’s Critique of Pure Reason: An Introductory Text*. University College Cardiff Press, Cardiff, UK
- Pinstrup-Andersen P, Pandya-Lorch R, Rosegrant M (2001) Global food security: a review of the challenges. *In* P Pinstrup-Andersen, R Pandya-Lorch, eds, *The Unfinished Agenda: Perspectives on Overcoming Hunger, Poverty, and Degradation*. International Food Policy Research Institute, Washington, DC
- Ruthenberg H (1971) *Farming Systems in the Tropics*. Oxford University Press, New York
- Schmitz A, Seckler D (1970) Mechanized agriculture and social welfare: the case of the tomato harvester. *Am J Agric Econ* 52: 569–570
- Schultz T (1964) *Transforming Traditional Agriculture*. University of Chicago Press, Chicago
- United Nations (1948) *United Nations Declaration of Human Rights*. <http://www.un.org/Overview/rights>
- United Nations (1972) *Declaration of the United Nations Conference on the Human Environment*. <http://www.unep.org/Documents/Default.asp?DocumentID=97>